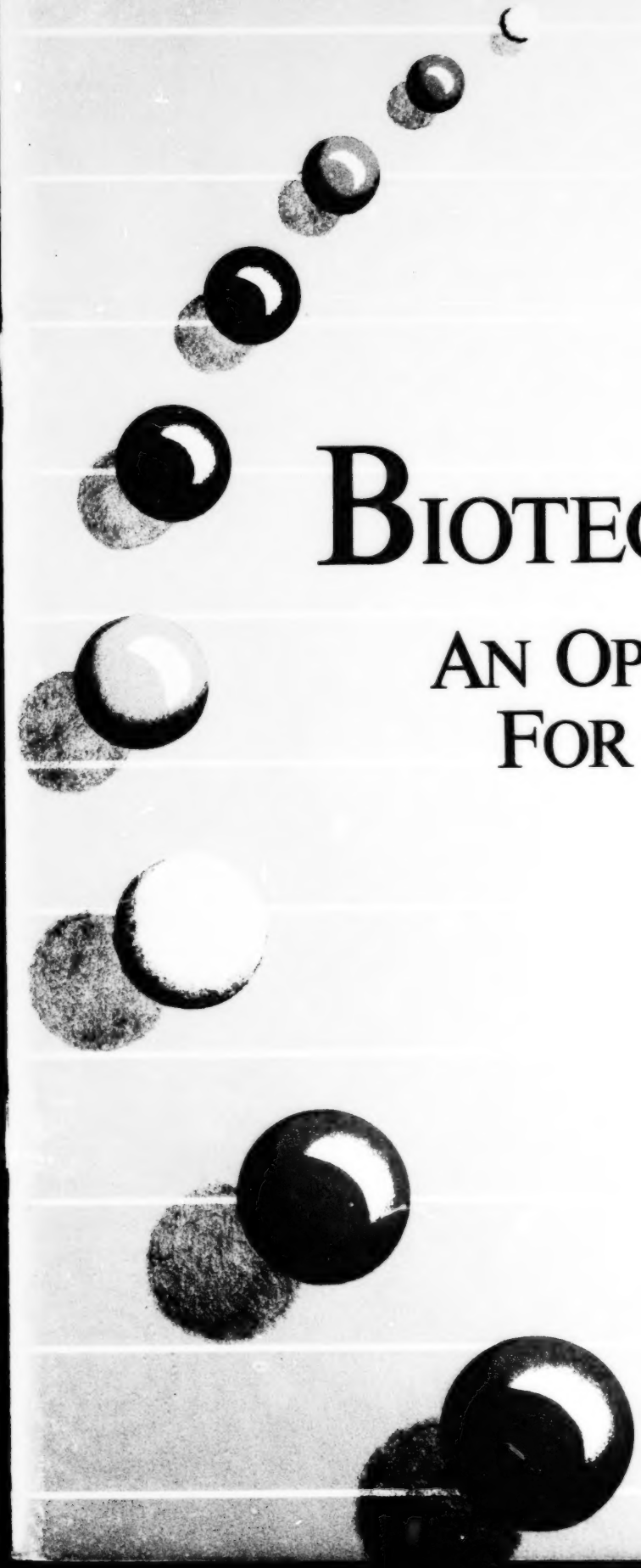


BIOTECHNOLOGY

AN OPPORTUNITY FOR GROWTH

87-02410/

BIOTECHNOLOGY: AN OPPORTUNITY FOR GROWTH

In the next decade, biotechnology promises to revolutionize industry worldwide. Development and assimilation of biotechnology is a prime vehicle for cooperative ventures between industry and the academic research community. The Nova Scotia Agricultural College presents a unique opportunity for such cooperation: a first-rate, modern research facility, a professional research staff and a small efficient management team. Our message is "Together we will produce the most meaningful research."

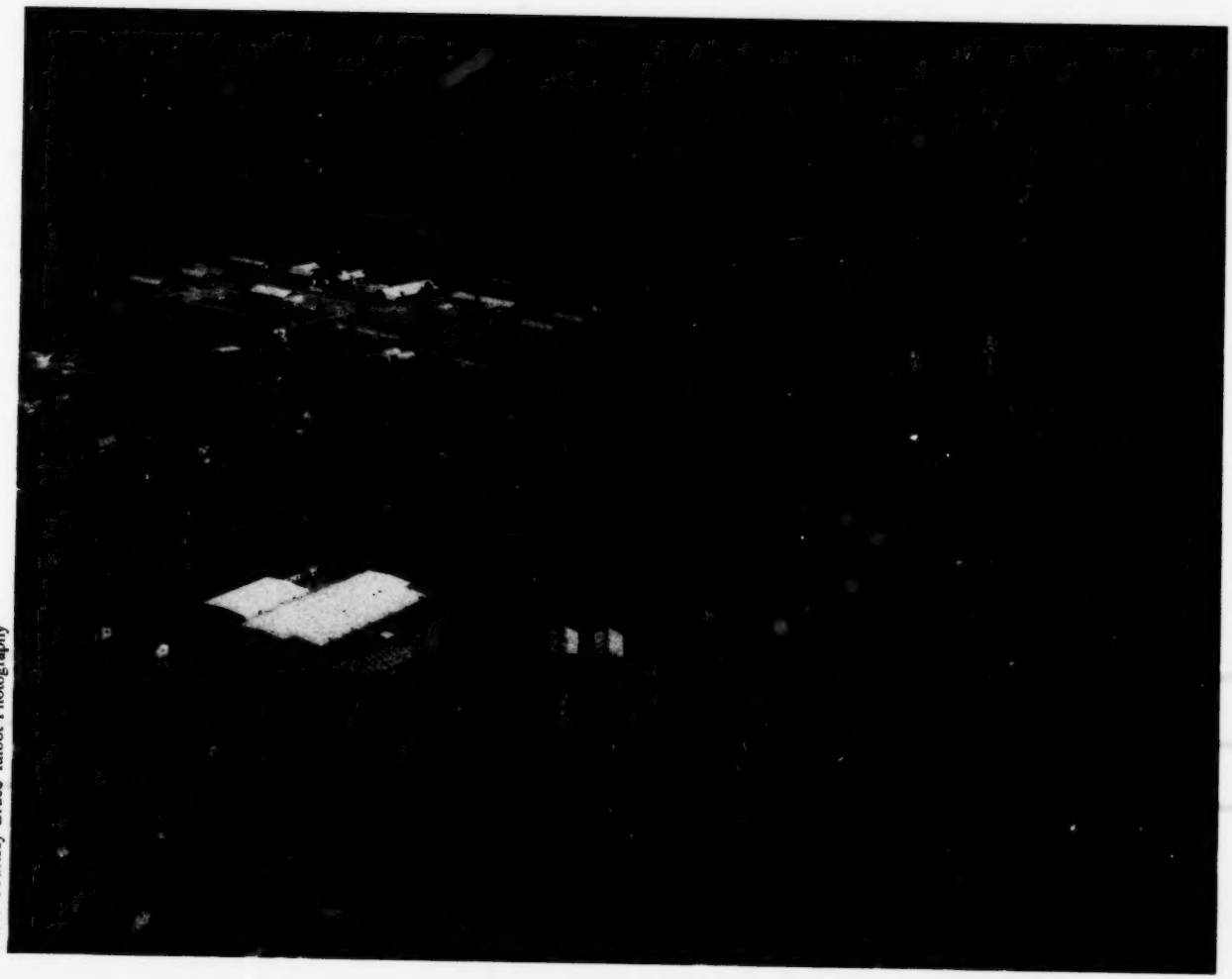
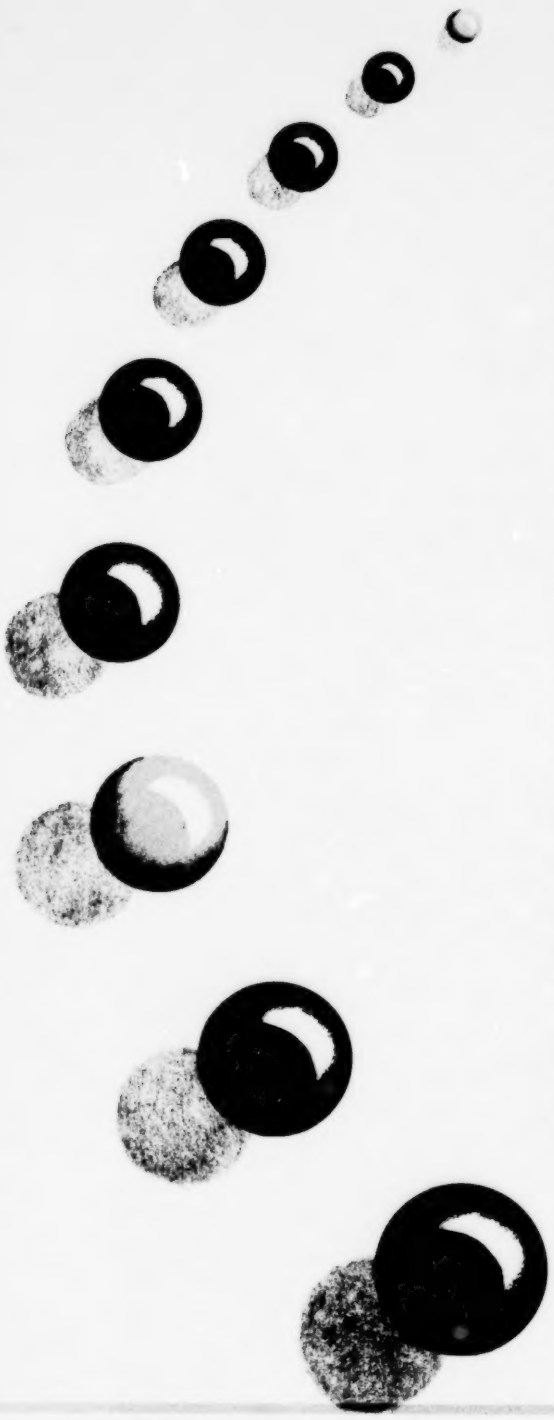


Photo Courtesy Bruce Talbot Photography



The information contained in this publication has been prepared by the Truro Industrial Commission with the assistance of the staff of the Nova Scotia Agricultural College. It has been prepared to acquaint organizations interested in the biotechnology field with the facilities and expertise which exist at the college to support in research in areas of mutual interest to industry and the college.

The Nova Scotia Agricultural College has developed into one of the finest agricultural teaching and research facilities in Canada. Biotechnology in its broadest sense has been used by agricultural researchers for a long time. Newer techniques in biotechnology have tremendous potential for the introduction of new products and new processes in agriculture. You will read in this publication the extent of expertise and facilities which exist and examples of contractual arrangements which can be made between industry and the college. These resources can be augmented by the Atlantic Institute of Biotechnology located in Halifax since the college is a participating partner in the Institute.

The college welcomes visits from and discussions with organizations who may wish to consider research proposals of interest to industry which match the research interests and capabilities of the college staff.

H.F. MACRAE

H.F. MacRae
Principal

THE OPPORTUNITY

THE NOVA SCOTIA AGRICULTURAL COLLEGE: EXCELLENT FACILITIES PLUS A HIGHLY PROFESSIONAL STAFF

The Nova Scotia Agricultural College has a total faculty of 71, of whom 29 have Ph.D.'s and 36 have Master's degrees in scientific fields. Fourteen of the faculty serve also as honourary faculty at Dalhousie University. The Agricultural College offers a four-year B.Sc.(Agr) degree course with seven major areas of concentration: plant science, animal science, agricultural economics, plant protection, agricultural chemistry, agricultural soils, and agricultural mechanization. In addition 11 technical programs in specialized areas of the agriculture and food industry are offered as are pre-engineering and pre-veterinary studies.

FACILITIES

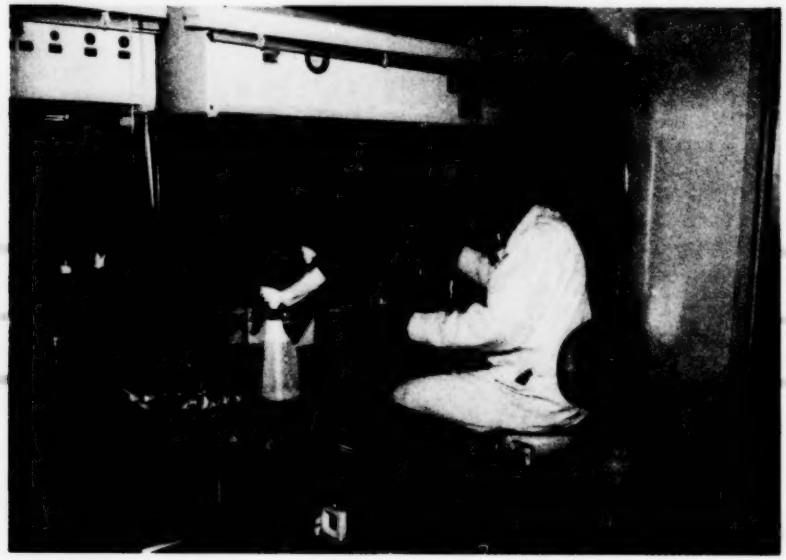
The main research, relative to biotechnology, is conducted in the Cox Institute of Agricultural Technology, originally built in 1968, and having numerous laboratories, classrooms and offices. The Cox Institute was expanded in 1984 so that the institute now houses an extremely modern and comprehensively equipped research facility. A new Animal Sciences building was occupied in January 1987 and in addition a separate building houses the Agricultural Engineering Department. There are several research and teaching laboratories, large modern greenhouses, climate controlled growth chambers, tissue preparation and culture rooms and extensive instrumentation capabilities in each department.

These facilities are currently available for a variety of research activities. The college welcomes cooperative arrangements whereby skilled personnel could use the facilities and the expertise of its faculty, while contributing to the high quality of the research environment already established. Beyond enabling the initial research and conceptual activity, there is also already in place an environment which can enable the research to proceed to laboratory scale tests, laboratory growth trials and then to field trials.

MANAGEMENT

Founded in 1905, the college has more than 80 years of history serving the agricultural community in Atlantic Canada, providing training in all aspects of farm management and technology, making technical service and consultation available to the surrounding farming community, and conducting basic and applied research in many fields of plant and animal sciences, biology, soil and agricultural chemistry. The administrative staff of the college numbers 12 and several of the senior administrators are also members of the faculty. Thus discussions can be held one-on-one and decisions can be made quickly and efficiently, without the need for extensive committee work.

Controlled environment chambers are used to provide uniform conditions for seedling production and plant growth experiments.



Laminar flow hood helps provide a sterile work area for preparing cultures.

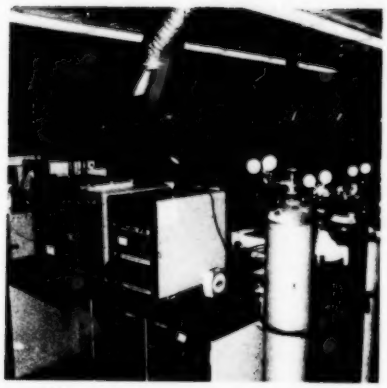
CHEMISTRY-SOILS DEPARTMENT

The Chemistry-Soils Department has nine full-time faculty members and five technical support people. Four of the faculty have specialized in chemistry, four in soil science and one in animal science. The facilities available for the department include about 2500 m² of classroom, laboratory and office space. Approximately 20 percent of the area is reserved for research work.

The instrument capabilities of the department include a full range of instruments for:

- Optical spectroscopy: molecular ultraviolet and visible absorption spectrophotometers; infrared spectrophotometer; fluorometer; atomic absorption; flame photometer; arc-spark emission spectrograph. Access is available locally to a mass spectrometer and nuclear magnetic resonance spectrometer.
- Radiochemical methods: liquid scintillation counter; gamma counter.
- Chromatography: thin layer chromatography; gas chromatography; high performance liquid chromatography; electrophorsis.
- Electrochemistry: potentiometric instruments; polarograph with DPAS capability; electrolysis analyser.

These instruments provide the capability of separating, identifying and analysing for most inorganic and organic components or contaminants in natural products, agricultural produce, soils, plant and biological tissues, feeds and fertilizers, chemicals and waters. Spectroscopy and electrochemical facilities allow the analysis of up to 60 inorganic elements in both major and trace amounts. Chromatography capabilities allow analysis for pesticides, drugs, steroids, vitamins, hormones, antibiotics, coccidiostats, amino and fatty acids, carbohydrates and proteins. Radiotracer faciltities allow such specialized procedures as radioimmunoassay and autoradiography. GC-MS mass spectrometer facilities and multi-nuclear magnetic resonance spectrometers for both liquids and solids are available locally. This equipment can be used to detect very low levels of pesticides and pesticide residues and many organic species can be detected at the pg level. Many elements at a trace level can be investigated with this methodology.



One of the largest instrument rooms in the Chemistry-Soils Department.

Laminar flow chambers facilitate work in isolated environments.

AREAS OF RESEARCH AND EXPERTISE

1 Protein and analytic chemistry. Development of analytical methods for the determination of certain additives, nutritional and toxic factors in feeds.

2 Pesticide synthesis; analysis of the distribution of organic materials (pesticides, residues, hydrocarbons) in the environment; computer modelling.

3 New methodology in nuclear magnetic resonance spectroscopy.

4 Determination of trace elements and heavy metals in soil.

5 Mineral nutrition in animals and animal breeding problems.

6 Fertility of domestic farm animals; pregnancy detection using plasma progesterone concentrations.

7 Soil organic matter; soil fertility; reclamation and revegetation of land; soil conservation and reducing soil degradation.

BIOTECHNOLOGY-RELATED RESEARCH IN THE CHEMISTRY-SOILS DEPARTMENT

1 The department is providing expertise in antigen binding studies, developed in research on hormone assays of pregnant cattle, to help set up a hybridoma laboratory. This will involve the selection of three or four cell types for the production of blood banking reagents, the fusion of these with myoloma cells and the production of monoclonal cultures. This system will also be used in the investigation of the clonal production of new plant types.

2 A major research project has just been completed on the use of sewage sludge on farmlands, looking at the contribution of the sludge to heavy metal content of soils and the uptake of heavy metals in plants from the sludge.

FACULTY

H.M. MacConnell, B.Sc. (Agr) (McGill), M.Sc. (McGill)

J.E. Hawley, B.Sc. (Agr) (McGill)

J. Hoyle, C.Chem., B.A. (York, England), B.A. (Open University), M.Sc. (Leeds), Ph.D. (Dalhousie)

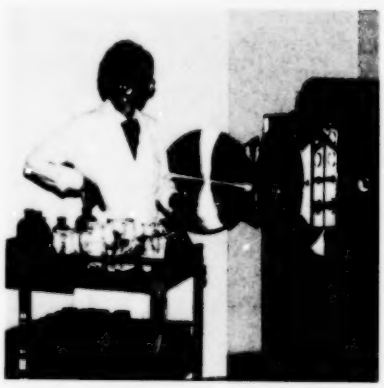
K.S. Maclean, B.Sc. (Dalhousie), M.Sc. (McGill)

J.C. Miller, B.Sc. (Agr) (Guelph), M.Sc. (Alberta)

A.S. Payne, B.Sc. (McGill), M.Sc. (McGill)

A.R. Robinson, B.Sc. (McGill), M.Sc. (McGill), Ph.D. (McGill)

P.R. Warman, B.Sc. (Rutgers), M.Sc. (Guelph), Ph.D. (Guelph)



Autoclaving media.

Micro-computers aid in rapid analysis and interpretation of experimental data.

PLANT SCIENCE

The Plant Science Department has 11 full-time faculty, 2 adjunct professors, and 6 technical support staff. The department also has a college grounds maintenance staff of four technical persons. Current research projects support 10 full-time research technicians and graduate students. The Department's facilities are housed in two buildings on the main campus and a field research station 2 km from the main campus. Approximately 50 percent of the floor space is reserved for research work, totalling about 750 m². There is a complete fleet of field research vehicles and machinery that can be moved to research plots anywhere in the region. The department is gradually assuming regional responsibility for cultivar and crop improvement evaluation. It is currently developing an agreement for federal funding to administer a regional cereal and forage evaluation program.

Facilities include three modern greenhouses; reach-in and walk-in controlled environment chambers, including a low temperature chamber; fully equipped tissue culture facilities; and crop and storage physiology, horticultural and agronomy research laboratories with laminar flow hoods and freeze drying equipment, an ADC gas exchange system, gas chromatograph, gel electrophoresis and other equipment.

AREAS OF RESEARCH AND EXPERTISE

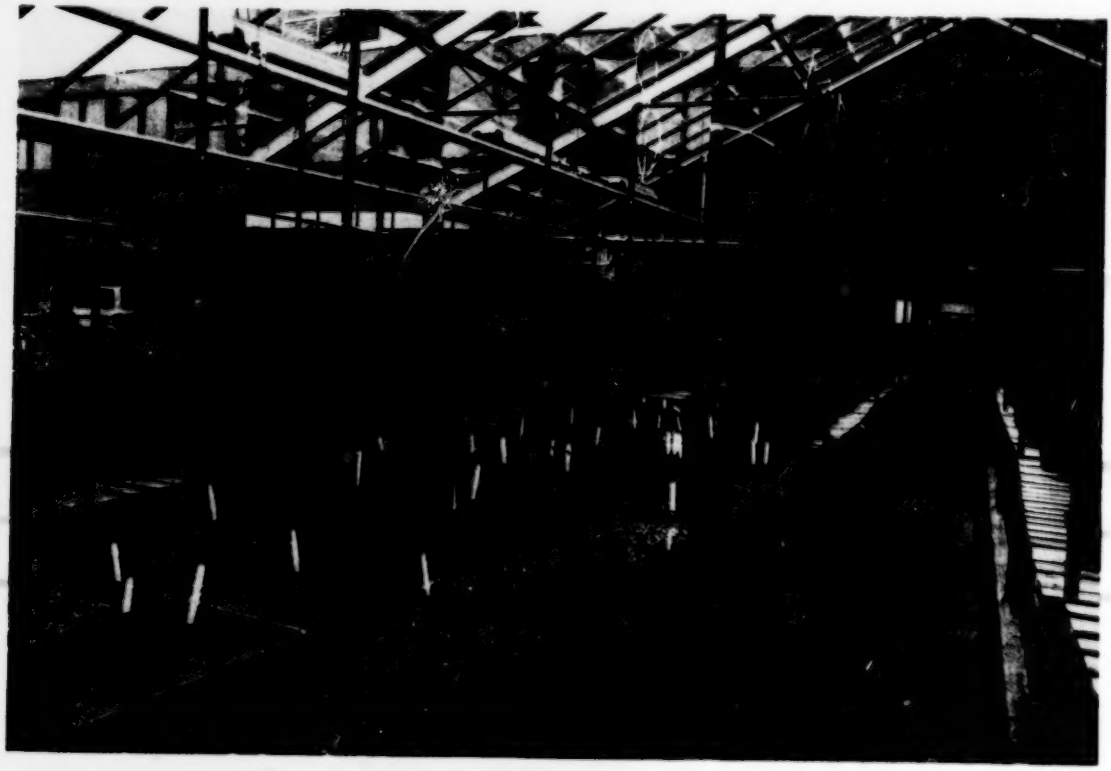
1 Plant biotechnology: *in vitro* selection for stress tolerance; organogenesis and somatic embryogenesis and their relation to secondary metabolism; micropropagation; germplasm preservation and plant microbial interaction.

2 Crop storage physiology of potato and specialty crops; stress physiology; grain physiology and management; ecology, physiology, carbon-nitrogen balance and management in legumes including forage legumes; nutritional physiology and quality evaluation in fruit crops; development of new specialty crops.

3 Crop breeding and quantitative genetics of forages and cereals.

4 Landscape horticultural design, construction and maintenance; nutrition effect on turf quality; evaluation and management of turf populations.

The Plant Science greenhouse produces a wide range of fruit, vegetable, ornamental and field crops year-round.



BIOTECHNOLOGY IN THE DEPARTMENT OF PLANT SCIENCE

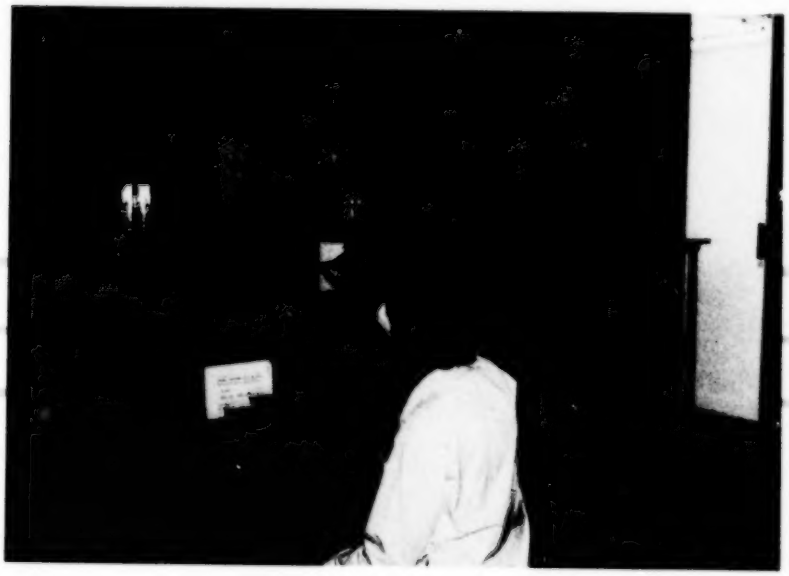
1 Working on forage legumes which do not survive winter very well — red clover, alfalfa, and on white clover — highly regenerative and cold stress tolerant lines will be created which will be used in screening for pathogen resistance and herbicide tolerance using callus and cell suspension cultures. In a white clover project it was found that one of the polyamines (cadaverin) accumulates during the hardening, and that the enzyme responsible for this compound (lysine decarboxylase) is inducible. The gene from a bacteria which constitutively specifies the same enzyme will be transferred into the clover which will then be assayed for expression of the constitutive gene. The hybridoma project will be used to produce monoclonal antibodies to try to identify the expressed genes. If there is an expression then the plants will be regenerated using these transformed pieces of tissue, and evaluated in comparison with the non-transformed plants.

2 A root promoting bacteria has been isolated which is in the vascular tissue and produces very strong well rooted plantlets. It is believed that this bacteria not only produces additional rooting and growth but, since it is in the vascular tissue, might prevent the pathogenic infection of plants like potato and strawberries. Because of this we may be able to omit a step in the propagation of the potato, going directly from test tube to field whereas there is now a greenhouse step, and have some protection against pathogenic bacteria. Since the bacteria promotes rooting, it may be useful with some plants which do not root *in vitro*, for example, poinsettia.

FACULTY

R.K. Prange, B.Sc. (Acadia), M.Sc. (British Columbia), Ph.D. (Guelph)
J.S. Bubar, B.Sc. (Agr) (McGill), M.S. (Pennsylvania State), Ph.D. (McGill)
C.D. Caldwell, B.Sc. (Mt. Allison), M.Sc. (Dalhousie), Ph.D. (East Anglia)
T.-M. Choo, B.Sc. (Nat. Taiwan Univ.), Ph.D. (McGill)
W.K. Coleman, B.A. (Univ. West Ont.), Ph.D. (Univ. West Ont.)
R.W. Daniels, B.Sc. (Agr) (McGill), M.S. (Michigan State)
J. Fraser, B.Sc. (London), M.Sc. (Aberdeen), Ph.D. (Canterbury)
T.H. Haliburton, B.Sc. (Agr) (McGill), M.S. (Cornell)
W.J. Higgins, B.Sc. (Mt. Allison), M.S. (Niagara)
H.-Y. Ju, B.Sc. (Agronomy) (Seoul), M.Sc. (McGill), Ph.D. (McGill)
L. Mapplebeck, B.Sc. (Agr) (Guelph), M.Sc. (Guelph)
J. Nowak, M.Sc. (Olsztyn), Ph.D. (Olsztyn), Dr. Habil (Olsztyn)
K. Padmanathan, B.Sc. (Madras), B.Sc. (Agr) (Colombo), M.Sc. (Pennsylvania State), Ph.D. (Pennsylvania State)

Nutrient solution tanks are monitored regularly for depth and nutrient content.



Controlled environment chambers for seedling production and plant growth experiments.

BIOLOGY DEPARTMENT

The Biology Department has a full-time faculty of eight, two Prof. Emeriti and one Adjunct Professor. Technical assistance is provided by five full-time technicians, four graduate students, and four research assistants. Biology faculty members serve as academic advisors to graduate students enrolled in programs at other universities such as Dalhousie and McGill.

Facilities in the department include research laboratories, field plots, greenhouses and environmental control rooms. Specialized laboratory equipment includes dew chambers; laminar flow isolation chambers; ELISA equipment; spore traps; gas chromatographs; specific ion electrodes for ammonia and nitrate determination; photomacroscopes; ultra microtomes; fluorescent microscopes; a radioisotope lab with scintillation counter; minicomputers and access to the VAX mini-computer.

AREAS OF RESEARCH AND EXPERTISE

1 Plant pathology: histology of plant pathogen interactions; plant bacterial pathogens; plant viruses and viroids; plant tissue culture; and diseases of potato and vegetables.

2 Plant physiology: plant nutrition; soil ecology; lowbush blueberry management.

3 Botany: plant anatomy and morphology; plant ultra structure; plant organ culture; plant development; parasitic angiosperms.

4 Entomology: IPM; monitoring systems of insect pests; soil arthropod extractions.

5 Microbiology: microbial ecotoxicology; soil microbiology; food microbiology.

6 Weed science: biological control of perennial weeds; mycoherbicides; weed biology; herbicide-pathogen interactions; quack grass and Canada thistle control.

Vegetable and small fruit research plots are located below the orchard.

BIOTECHNOLOGY-RELATED RESEARCH IN THE DEPARTMENT OF BIOLOGY

1 Test tube pollination and seed development of cultivated potatoes. There are a number of incompatibilities that prevent plant breeders from making crosses between desired genotypes of *Solanum tuberosum L.* The major obstacles occur at the pollen-gynoecial interface, and the goal of this research is to provide plant breeders with *in vitro* methods of circumventing these breeding barriers in order to develop and transfer new sources of germplasm. Two techniques that could lead to *in vitro* fertilization have been identified, namely, placental pollination and ovariandish pollination. Refinement of these techniques is currently underway in cooperation with the Institute of Biology, Adam Michiewicz University, Poland.

2 Biological control of perennial weeds, isolation and testing of insect and plant pathogens. Biological herbicides have been found to be not only environmentally more sound, but to be more effective — sometimes up to twice as efficient. Mycoherbicides are therefore one of the top issues in the vitally important field of weed control. Seven insects have been introduced to five weeds and three weeds have been surveyed to assess damage caused by biotic agents. A weed survey for naturally occurring pathogens for their potential as mycoherbicides has been carried out; in excess of 50 pathogens have been isolated from more than 20 weeds and are currently being evaluated for their potential as mycoherbicides. Six fungi believed to have good herbicide potential on commercially important weeds currently await further testing. The faculty member working on this project initiated his research at Macdonald College and conducted research on mycoherbicides that are now close to being registered. The department has a cooperative arrangement with Macdonald College.

FACULTY

Plant Pathology
L.A. McFadden, B.Sc. (Agr) (McGill), M.Sc. (Cornell), Ph.D. (Cornell)
A.B. Gray, B.Sc. (Bishops), M.Sc. (McGill), Ph.D. (McGill)
Plant Viruses and Viroids
R. Singh, B.Sc. Ag. (Agra), M.Sc. Agr. (Agra), Ph.D. (N. Dakota State)
Botany
A.R. Olson, B.A. (Augustana), M.Sc. (Wisconsin), Ph.D. (Alberta)
Entomology
J.-P. R. Le Blanc, B.A. (Montreal), B.Sc. (Quebec), Ph.D. (McGill)
Zoology
L.E. Crosby, B.Sc. (Acadia), M.Sc. (Acadia)
Plant Physiology
L.J. Eaton, B.Sc. (Acadia), M.Sc. (Dalhousie)
Weed Science
M.G. Sampson, B.Sc. (Dalhousie), B.Sc. (Agr) (McGill), M.Sc. (McGill)
Microbiology
G.W. Stratton, B.Sc. (Agr) (Guelph), M.Sc. (Guelph), Ph.D. (Guelph)

A side swipe application allows the herbicide "round-up" to be applied accurately to weeds between rows of a red clover trial.

Taking nodal cuttings on potatoes.

ANIMAL SCIENCE

The Animal Science Department offers a wide range of capabilities and services to the scientific and business community of the Atlantic region. These are centered around the research and development interests and activities of an 11-member professional staff working with all farm livestock species of regional economic importance. A new animal science building provides extensive laboratory space, an animal holding and surgical area, and data processing facilities. In addition, there are separate housing facilities for several farm species, a feed preparation facility and 200 ha (hectares) of farm land with a range of soil types. In general, the animal housing units conform to commercial facilities, though most structures have undergone some modification in connection with research use.

Radioassay of tritiated water in soil.

AREAS OF RESEARCH AND EXPERTISE

1 Nutrition. Research in the areas of digestion and metabolism is currently being conducted under controlled commercial conditions and laboratory conditions, on domestic and laboratory animals. Specific activities include determination of nutrient requirements; evaluation of feed composition and quality; study of feed additives and supplements; characterization and prevention of metabolic disease; and modelling of metabolic functions.

2 Physiology. Control of reproduction in livestock; genetic and environmental influences on reproduction; artificial insemination in swine, foxes and chickens; effect of environmental factors on performance in fur animals and chickens; and kinetics of feed passage in ruminants.

3 Animal breeding. Genetic control of growth; genetic aspects of carcass composition and quality in chickens; genetic effects on condition and performance of cattle; and genotype/environment studies with cattle and chickens.

4 Animal behaviour. Projects dealing with behavioural aspects of handling and rearing methods in cattle and alternative housing systems for chickens are currently underway.

FACULTY

L.M. Cock, B.Sc. (Agr) (McGill), M.S. (Wisconsin), Ph.D. (Maine)
D.M. Anderson, B.S.A. (Manitoba), M.Sc. (Manitoba), Ph.D. (Saskatchewan)
M.L. Connor, B.Sc. (Agr) (Guelph), M.Sc. (Manitoba), Ph.D. (Manitoba)
D.C. Crober, B.Sc. (Agr) (McGill), Ph.D. (British Columbia)
N.L. Firth, B.Sc. (Edinburgh), M.S. (Purdue), Ph.D. (Cornell)
A.H. Freeden, B.S.A. (Saskatchewan), M.Sc. (Guelph), Ph.D. (California)
A. Lirette, B.S.A. (Laval), M.Sc. (Laval), Ph.D. (Alberta)
E.G. Maynard, B.Sc. (Agr) (McGill), M.Sc. (Guelph)
W.G. Mathewson, B.Sc. (Agr) (Aberdeen), D.T.A. (Trinidad), M.Sc. (Aberdeen)
D.L. Patterson, B.Sc. (Alberta), M.Sc. (Guelph), Ph.D. (Guelph)
T. Tennessen, B.A. (Alberta), B.Sc. (Alberta), Ph.D. (Alberta)

Sampling rumen fluid from a cannulated goat.

THREE SUPPORT DEPARTMENTS

AGRICULTURAL ENGINEERING

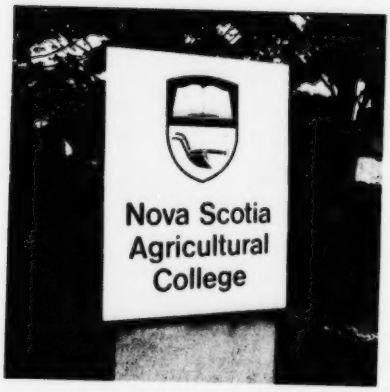
The Agricultural Engineering Department consists of eight faculty, four technical and one clerical support staff, housed in a separate facility having a total of 2 664 m². There is equipment for testing, measuring and demonstrating various engineering f: 'ors such as a universal testing mach.. e and environmental measuring equipment. Research interests in the department include evaluation of field machinery systems; agricultural structure and crop storages; computer-aided design and drafting; use of solar energy; soil and water research.

AGRICULTURAL ECONOMICS

The Agricultural Economics Department has six faculty, along with one technician and one clerical support staff. The department has a good sized computer facility equipped with six IBM personal computers, access to the VAX mini-computer and a large software library. Areas of research interest include farm management decision making; applied econometrics; policy applications in agricultural commodity markets; and farm and regional planning models.

MATHEMATICS AND PHYSICS

The Department of Mathematics and Physics is responsible for the operation of the NSAC/NSDAM Computer Centre. Research and teaching are supported by a DEC VAX 11/750 mini-computer and a number of 16-bit micro-computers. The department provides courses in both disciplines as well as in computer science, advanced statistics and meteorology.



THE SCIENTIFIC ENVIRONMENT

The scientific research environment of Nova Scotia is first class and one of the largest in Eastern Canada. There are five other excellent universities within an hour's drive of the Nova Scotia Agricultural College —Dalhousie University, St. Mary's University, Mount Saint Vincent University and the Technical University of Nova Scotia, all located in Halifax, and Acadia University, in Wolfville. In addition there are modern research facilities at which biotechnology-related research is currently being carried out, at the Cancer Research Institute, the Cardio-Vascular Research Center, the National Research Council, and the Nova Scotia Research Foundation, all in the Halifax area.

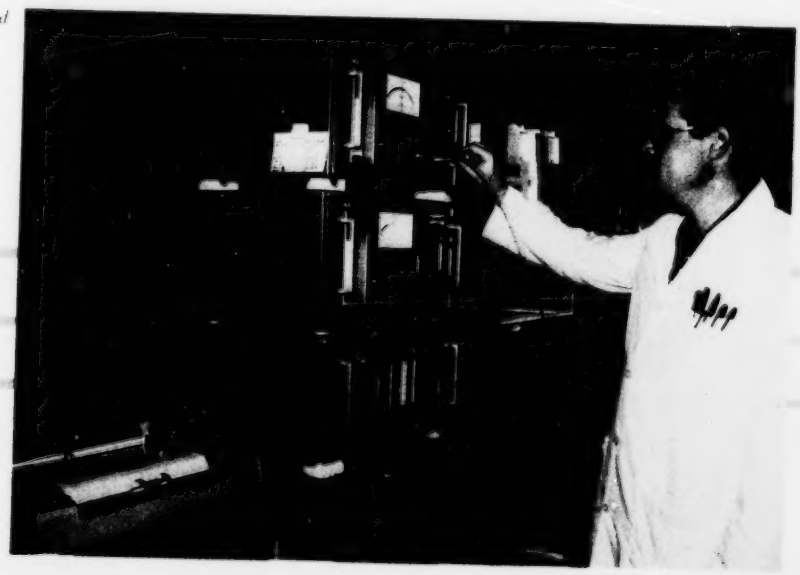
Four of these institutions, Dalhousie University Life Sciences Center, the Nova Scotia Agricultural College, the Technical University and the Nova Scotia Research Foundation, have formed an independent research institute — the Atlantic Institute of Biotechnology — to assist industry in the Atlantic region of Canada to develop and improve processes that involve biological components. The Atlantic Institute of Biotechnology serves to focus scientific expertise and research capabilities of the Atlantic region on industrial problems. It maintains an inventory of the scientific resources of the region in an easy-access computer program so that facilities and personnel can be shared and used most efficiently.

THE REGULATORY ENVIRONMENT: ONE UNIFORM REGULATORY CODE IN CANADA

In Canada, there is one national regulatory regime of approval which is well defined and uniform. This can be approached to give a reasonably accurate and quick answer as to whether a project is one they would agree to proceed on. Once that approval has been received you are free to proceed on the guidelines that have been provided. This does not mean that regulation is less stringent in terms of environmental and human protection but it does mean that, because response is efficient and univocal, projects can proceed in a businesslike and orderly fashion.

It has been the experience of many companies attempting to enter the biotechnology field that one of the main obstacles to proceeding beyond the initial research phase to prototypical laboratory production and subsequent field trials is the number of levels of regulatory control codes which have to be satisfied. At times these codes can even be conflicting, resulting in inefficiency and frustrating loss of valuable time. There is no such conflicting set of regulatory codes in Canada, and experience has shown that it can be quicker by as much as a factor of ten to obtain the necessary licencing in this country for an identical project.

Adjusting an infrared analyzer used in measuring photosynthesis and respiration in plant tissues.



DOMINION BIOLOGICALS: AN EXAMPLE OF COOPERATION BETWEEN INDUSTRY AND COLLEGE

Dominion Biologicals Ltd. was founded in 1972 and now manufactures and markets a complete range of blood banking reagents. It is the only such company in Canada and one of only seven in the world (six are located in North America). Dominion Biologicals decided to develop a hybridoma laboratory to assimilate and effectively utilize new biotechnologies in the quest for safer and more innovative products. The initial objective is to convert the current range of polyclonal antibody-based products to monoclonal antibody production by the year 1990. Dominion Biologicals initiated discussions with the Nova Scotia Agricultural College in 1985. Co-development efforts began immediately with the faculty of the Chemistry-Soils and the Plant Science departments. By early 1987, the hybridoma laboratory will be operational. Two internationally recognized hybridoma experts, Dr. Wayne Thompkins from the University of Illinois, and Mr. David Dobbie from Dominion Biologicals, will manage this project, in cooperation with faculty of the college, and at the same time contribute to the academic environment of the college.

This arrangement provides significant advantages to both partners. The college benefits from the presence of highly qualified research personnel complementing their research teams, as well as from the influx of funds. The industrial partner benefits from the use of the expertise of the faculty as well as the use of a first-rate research facility. Without this the company would have to invest large amounts of capital on a long-term basis into permanent facilities which may only be used for a much shorter time period.

Monitoring cultures in the tissue culture growth room.

TRURO: HUB OF NOVA SCOTIA

The Town of Truro provides an excellent opportunity for industrial growth through biotechnology research and product development and manufacture. Located at the very center of Nova Scotia, it is easy to see how Truro became know as the "Hub Town". Truro is an important center of transportation, manufacturing, agriculture, trade and education.

Truro has a wide range of banking, financial and professional services and its gentle climatic conditions compare very favourably to other areas of Canada and the United States. The town's broad based economy has remained stable over the years, and it has acquired importance in industrial production, in addition to its merits as a warehousing and distribution center, its healthy agribusiness and its retail prominence in central Nova Scotia. A number of national and international manufacturing companies have already located here, Polymer International and Andres Wines, for example. The largest employer is the textile industry, with two internationally known firms — Stanfield's Limited and Crossley Karastan Carpet Mills Ltd.

Truro is the center of a network of highways and roads to all parts of the province, including a four-lane highway to nearby Halifax, a world port on the international sea lanes. Halifax International Airport is only a 35-minute drive away. Truro is also on the main line of the Canadian National Railway system between Montreal and Halifax. Hence, Truro has easy connections via Halifax to all major cities in Europe, the United States and Canada.

THE OPPORTUNITY FOR INDUSTRIAL DEVELOPMENT THROUGH RESEARCH AND PRODUCT DEVELOPMENT

This publication has been prepared by the Truro Industrial Commission with the active support and co-operation of the Nova Scotia Agricultural College.

In addition to the excellent opportunity for research in biotechnology related to agriculture, there is the opportunity to develop commercial products flowing from the research efforts.

In order to facilitate the research effort, funding assistance for projects may be made available from several of the Federal Government agencies. These include:

- National Research Council
- Department of Regional Industrial Expansion
- various university research funding programs.

The Government of Nova Scotia, through its Department of Development, is prepared to assist in funding research projects offering the potential for commercial production. The Atlantic Institute of Biotechnology is another agency which is prepared to assist industrial research through funding assistance or contract research effort.

Substantial industrial incentive programs are also available for the capital costs associated with the establishment of new facilities through the Federal and Provincial governments.

We wish to thank the Department of Regional Industrial Expansion and the Department of Development of the Nova Scotia Government for their financial assistance in producing this publication.

We believe that the Truro area offers a unique opportunity for companies doing work in the field of biotechnology and invite inquiries from interested companies and individuals who would like to have full details.

Please contact:

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P.O. Box 427
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Canada B2N 5C5

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Various field crops under test with NSAC farm in background.

All photos, except the one appearing on page 1, courtesy the Nova Scotia Agricultural College.

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